CASE STUDY NO. 2

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Office of the Director
Reston, Virginia 22092

MEMORANDUM

JUL 1 1994

To: Director, Office of Financial Management

Through: Elizabeth A. Rieke
Assistant Secretary--Water and Science

From: Gordon P. Eaton
Director, U.S. Geological Survey

Subject: Alternative Management Control Review--National Mapping Division Contractually Produced Digital Orthophoto Quadrangles

Attached is the completed Alternative Management Control Review for Contractually Produced Digital Orthophoto Quadrangles in the National Mapping Division. Extensive testing of the program was conducted by reviewing existing records, completed forms, or other documentation; by interviewing/eliciting information from the personnel who perform the control technique; or by observing the performance of a specific control technique. This testing was sufficient to provide reasonable assurance of detecting any significant control weaknesses. There were no identified control weaknesses.

Attachment

Copy to: Office of Inspector General

ALTERNATIVE MANAGEMENT CONTROL REVIEW

CONTRACTUALLY PRODUCED DIGITAL ORTHOPHOTO QUADRANGLES

GENERAL INFORMATION

MISSION OF THE NATIONAL MAPPING DIVISION (NMD)

The National Mapping Division (NMD) supports the U.S. Geological Survey's (USGS) mission to provide national earth science information in a variety of ways. The NMD provides current and accurate maps and other graphic products, as well as a variety of digital cartographic products to meet the needs of Federal and State governments and the private sector for multipurpose base information. The value of these digital cartographic data is increasing rapidly as computers become more readily available to a wider cross section of users. Additionally, new applications, such as those found in Geographic Information Systems (GIS), find their way into the decision making process at all levels. Advanced techniques for collecting, processing, and disseminating digital cartographic data are constantly evolving to meet the increasing demands. One of the newer products in high demand is the Digital Orthophoto Quadrangle (DOQ). Orthophotos. combine the image characteristics of an aerial photograph with the accuracy of a conventional map. When these data are combined with other earth science data, particularly in GIS systems, new levels of measurement and analysis are possible, providing increasingly high levels of support to the decision making process. These data are being used to support land use programs, resource management applications, transportation studies, and update of other products.

The NMD combines appropriated and reimbursable funds to produce these data. The annual appropriation is not sufficient to meet all of the high priority requirements of NMD and other activities. When joint requirements can be satisfied, the NMD enters into a variety of reimbursable work agreements with Federal, State, and local agencies, and some nongovernmental activities to fund the priority projects these organizations require.

LIMITS OF THIS ALTERNATIVE MANAGEMENT CONTROL REVIEW

A thorough Alternative Management Control Review of the entire Reimbursable Cartographic Program was completed in June of 1991 and all associated weaknesses have been corrected. Since then, the digital orthophoto program has expanded. The production procedures to generate the digital orthophoto product also have been refined. Additionally, the NMD is placing an increasing reliance on private contractors to provide the production capacity for a large part of this program. This AMCR is limited to the capabilities and procedures developed since the 1991 study. it focuses on the contract production process and examines the assignment of priorities, billing procedures, and quality control activities supporting contracted production.

FUNDING LIMITATIONS FOR COOPERATIVE CARTOGRAPHIC WORK

Cooperative cartographic work with other ***Federal*** agencies is generally performed under an appropriate agreement. There are no legal or regulatory requirements regarding the distribution of costs, therefore other-agency share of costs can be any percentage from full repay to no payment at all. Because this program produces a DOQ, which is a standard NMD product, the NMD goal is to share costs on a 50-percent-of-total basis whenever possible. Fixed prices based on average costs are used to compute the agreed funding levels.

Cooperative cartographic work with the ***States*** is subject to different regulations, evenwhen an NMD standard product results the process. Public law (43 U.S.C. 50) allows the USGS to enter into cooperative mapping projects with States, including counties and other municipal organizations. Language in the USGS's annual appropriation (P.L. 101-512), however, limits the amount of appropriated funds used for cooperative projects with States and municipalities to 50 percent of the actual cost. Estimated costs are provided to the cooperating agency as a planning tool but reimbursement to NMD is based on actual costs.

Historically the NMD has entered into ***private*** cooperative agreements for products with only service organizations such as the Boy Scouts of America, or academic institutions that are capable of providing unique insight into a technical investigation. To date there has been no opportunity to explore this funding option for the DOQ product.

The basis of reimbursement received by NMD can take several forms, direct payment of funds by the cooperator, work share where each agency performs a portion of the work and data exchange which provides for receipt of digital data of like value for that generated by NMD production processes. Supplemental funding is used to provide the incentive for a cooperating agency to add value or complete a product to NMD specifications. In this case, NMD transfers funds to the cooperating agency for the additional services.

ANALYSIS OF THE CONTROL ENVIRONMENT

The control environment is strong and dynamic due in large measure to the experience with a reimbursable program through the years. Management emphasizes a commitment to the existing directives and policies which delineate the procedures to be followed in this activity. Positive attitudes are evident from the personnel associated with the program. This is due largely to the successful implementation of tailored production software, systems, and procedures developed by NMD managerial and technical staff to pursue this activity. There is continuous interaction between the various offices associated with negotiating agreements with other organizations, and with completing the assignments. Because the program was developed within NMD, there is an exemplary sense of dedication to ensuring a quality outcome for each project. The shared responsibility for completion of this program institutes many checks and balances throughout the production process. Because of the control exercised at the various stages, an error made at one level would be quickly caught at the next before processing could continue.

See Attachment A, "Analysis of the General Control Environment" for a detailed summary of the General Control Environment.

DOCUMENTING AND ANALYZING THE PROCESS

The process was documented by delineating a high level event cycle for the process, (Attachment B). Using the event cycle for guidance, the risks associated with each event were identified in discussions with various headquarters and production personnel associated with the program. This step included analyzing the impact on the event, should the undesirable consequence occur. Once these were defined, it was possible in the next step to estimate the probability associated with each. Various production and staff personnel were interviewed to determine the probability of an undesirable event happening, and the management controls in place to mitigate each risk. The results are included as Attachment C, and a list of personnel and their contribution is at Attachment D.

TESTING

Testing was conducted at headquarters and at the Western Mapping Center in Menlo

Park California. Headquarter's elements are responsible for product standards, overall program direction, and final resolution of the financial agreements between USGS and cooperating agencies. Western Mapping Center (WMC) is in operational control of the program, with an organizational element dedicated to conducting the day-to-day activities of the program. In support of the contracting process, there are several WMC personnel serving as Contracting Officer's Technical Representatives (COTR); each is assigned primary responsibility for each contractor and a deputy is assigned back up duties. They have also established source evaluation, Quality Control, and product handling units.

Testing was conducted during April and May 1994 by review of existing documentation and record keeping procedures, interviews with staff and production personnel, and observation of production coordination activities. All information gathered is summarized and documented on the attachments included. in this AMCR report.

INVESTIGATIVE RESULTS

As a result of the investigation, the contracted DOQ production program was found to be functioning effectively and efficiently. The possibility of waste, fraud, and abuse is considered to be minimal. There are however some aspects of the process which would benefit from changes in the production procedures:

1. For all cooperative projects, there has always been a potential problem associated with cooperative funding agreements with States. USGS is limited by law to paying only 50% of the costs. Schedule or requirements changes can often result in unanticipated cost increases. The cooperating State then must provide additional funds to meet their hag of the increase. Problems are likely to occur when the State agency has a different fiscal year than the Federal Government, and is unable to readily acquire additional funding. NMD may be required to negotiate a decrease in the size of the project, accepting payment "in-kind" for products or data, or finding a different source of funding in order to avoid violating the 50% provision.

   Recommendation. Much of the uncertainty associated with this program would be eliminated if the source material such as aerial photography, field control, and map separates to be used for the project were to be collected and evaluated prior to making a resource estimate and giving it to the cooperator. A better feel for the quality and completeness of the source would eliminate schedule changes and the need for additional funds to acquire additional control or elevation models. NMD does not provide the resources for this "up front" evaluation, which has been described by several personnel interviewed as part of the cost of doing business. it is recommended that NMD evaluate the utility of available source material prior to entering into cooperative agreements.

2. Because the time required to collect and evaluate the source material (usually about 4 months) must be added to the time necessary to negotiate a contract, it is crucial that firm guidance as to the number of products which can be funded be provided as early as possible. The uncertainty in the level of funding greatly inhibits the ability of program managers to plan and allocate resources for the collection and evaluation of source material. There is a very real possibility that the obligation dates associated with the contracting process may preclude achieving the fiscal year's goals if final production requirements aren't known until near the end of the fiscal year.

Recommendation. To facilitate planning, production personnel have requested a periodic report, preferably monthly, showing the contract dollars remaining for projects. Given the lead times required to assemble and evaluate the source material to be used on a project, the limited number of personnel available, and the fact that the contractor can add another 11 weeks in evaluation and negotiation, this request seems reasonable.

ALTERNATIVE MANAGEMENT CONTROL REVIEW

CONTRACTUALLY PRODUCED DIGITAL ORTHOPHOTO QUADRANGLES

Although no control weaknesses were identified in the management review, two areas in which changes to management procedures or production process would strengthen the program were identified.

NUMBER	OPPORTUNITIES FOR STRENGTHENING PROGRAM	PROPOSED ACTION	COMPLETION SCHEDULE
1	Move source evaluation to an earlier point in the event cycle	Establish a process to facilitate earlier source collection and analysis	Details to be developed during a Government Furnished Materials Technical Exchange Meeting to be held in July 1994
2	Provide more frequent reports on the status of funds available for contract production	Initiate a more frequent reporting cycle to permit more detailed advance planning.	A more specific reporting program will be implemented beginning with the 4th quarter FY 1994

ANALYSIS OF THE GENERAL CONTROL ENVIRONMENT

	N/A	AGREE	UNCERTAIN	DISAGREE	COMMENT
POLICIES AND PROCEDURES					
Are policies and procedures clearly stated in writing and organized in manuals, handbooks, or other?		X			
Are they communicated throughout the assessable unit?		X			
Are they consistent with applicable laws, regulations, and policies prescribed by higher levels?		X			
Are they easy to locate at all times?		X			
PLANNING, BUDGETING, AND REPORTING					
Does the approved budget become the operating plan.		X			
Are plans and budgets effectively communicated throughout the assessable unit?		X			
Are financial reports available for comparison to the budget?		X			
do managers in the assessable unit make the comparison referred to above and initiate corrective action?		X			
Are expenditure reports accurate and timely?		X			
Are reports scanned by higher level management?			X		See note 1
[1] Many reports are provided but it was impossible to ascertain whether all the information reported was used by headquarters management, or just the data needed for a particular application. No activity receiving reports complained about too little data.					

ATTACHMENT A

	N/A	AGREE	UNCERTAIN	DISAGREE	COMMENT
DELEGATION OF AUTHORITY AND RESPONSIBILITY					
Do delegations of authority exist in writing?		X			
Do they clearly outline duties, authority, and responsibilities (including any limitations thereof)?		X			
Do they prevent overlapping duplication, and conflicts of duties/authority/responsibility?		X			
Do they grant sufficient authority to carry out the responsibilities?		X			
PERSONNEL PRACTICES					
Is the Standards of Conduct for Federal Employees brought to employees' attention annually?		X			
Does each employee have an accurate up-to-date position description?		X			
Do performance standards include internal control considerations?		X			
In addition to the annual performance appraisal, are there interim appraisals/counseling sessions?		X			
Has there been training on internal controls for supervisor/managers of the assessable unit?			X		See note 2
Are there sufficient training opportunities to improve job competency and to update employees on new policies and procedures?		X			
Are employees held responsible for their performance?		X			

[2] There has been no recent formal training in management control at WMC and some supervisors have been promoted to supervisory roles since the last training session. Additionally several of the trained personnel took advantage of the "early out" window. All employees interviewed seemed to be familiar with the process and concepts. In addition, a brief tutorial was provided as part of the AMCR, to focus the review discussions and orientation. For practical purposes, the tutorial and participation in the review may suffice until a formal training course can be provided.

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	N/A	AGREE	UNCERTAIN	DISAGREE	COMMENT
MANAGEMENT ATTITUDE AND COMMUNICATION					
Is management of this assessable unit aware of the importance of internal controls as they relate to this unit?		X			
Has management communicated that importance to employees in the assessable unit?		X			
In the past year has management specifically reviewed internal controls to assure they are working?		X			
Does unit management hold regular staff meetings?		X			
Is management receptive to suggestions for changes in operating procedures?		X			
ORGANIZATIONAL CHECK AND BALANCES					
Are contracts or cooperative agreements audited regularly by a third party?		X			
ADP CONSIDERATIONS					
Are security measures in effect which limits the use adp equipment to authorized personnel?	X				
Are published instructions and procedures available to the user or operator of this equipment?	X				
Are controls used to assure that only approved input is accepted in the system?	X				
Are output reports timely and reviewed for correctness?	X				
Are physical security measures present for the protection of the equipment during both office hours and non-office hours?	X				

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	N/A	AGREE	UNCERTAIN	DISAGREE	COMMENT
ORGANIZATIONAL STRUCTURE					Currently reorganizing
Does the assessable unit have clearly written goals and objectives?		X			
Does the assessable unit have necessary authority to meet those goals/objectives?		X			
Is the assessable unit sufficiently flexible to accommodate changes?		X			
Is the assessable unit held accountable for the results of this operation?		X			
Is the organizational chart current?		X			
Does the organizational structure provide for adequate separation of duties?		X			
Does the organizational structure provide for adequate supervision?		X			

Evaluation of factors derived from interviews and observations with personnel from various locations and levels within the Division, and review of documents and records.

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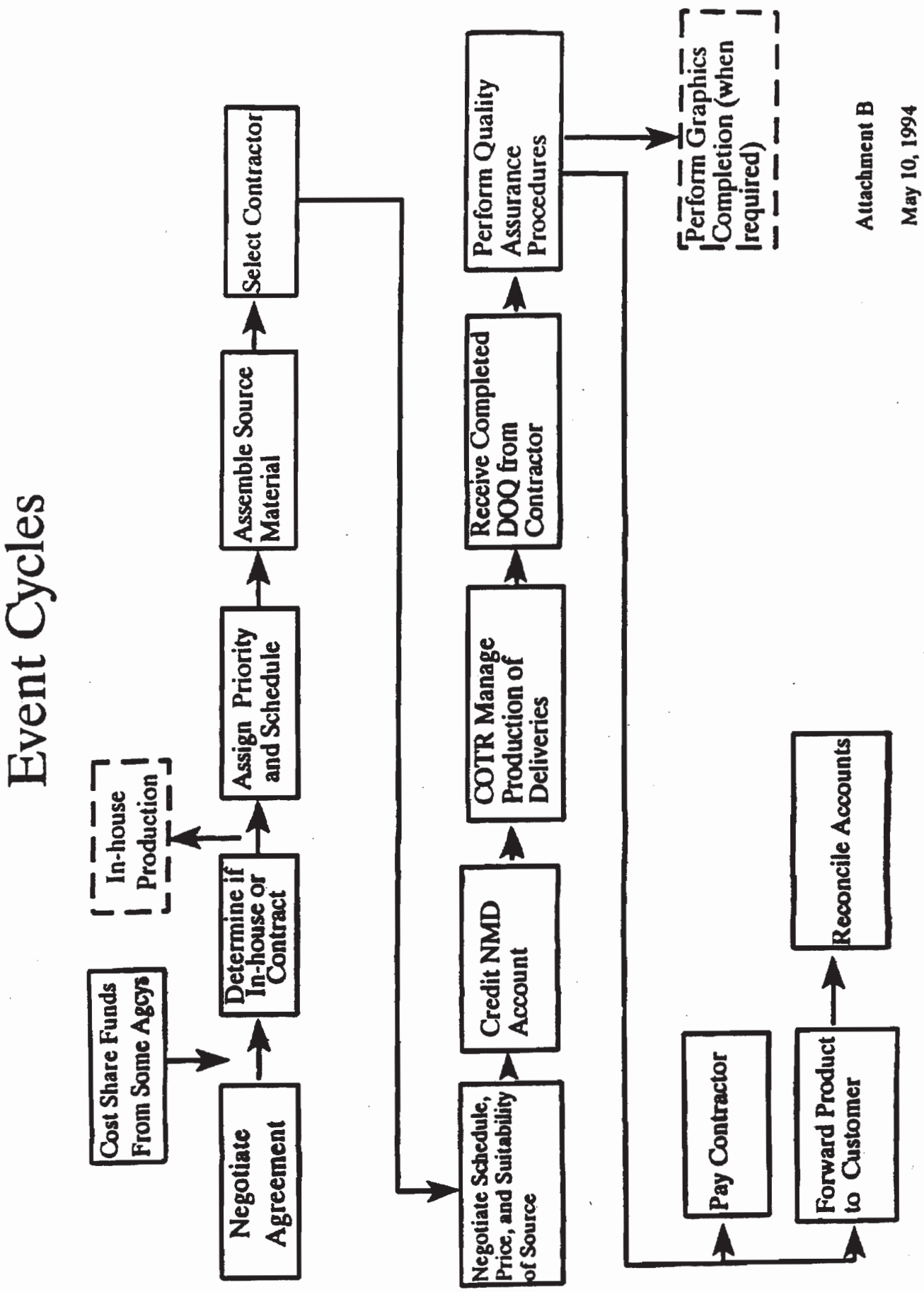
Event Cycles
Cost Share Funds From Some Agcys
In-house Production
Negotiate Agreement
Determine if In-house or Contract
Assign Priority and Schedule
Assemble Source Material
Select Contractor
Negotiate Schedule, Price, and Suitability of Source
Credit NMD Account
COTR Manage Production of Deliveries
Receive Completed DOQ from Contractor
Perform Quality Assurance Procedures
Perform Graphics Completion (when required)
Pay Contractor
Forward Product to Customer
Reconcile Accounts
Attachment B
May 10, 1994

ALTERNATIVE MANAGEMENT CONTROL REVIEW

WORKSHEET FOR DOCUMENTATION OR EVENT CYCLES, RISK, RISK SCALE IMPACT AUTHORITY, AND CONTROL TECHNIQUES

COMPONENT: NMD PRODUCTION OPERATIONS OFFICE

1. Agreement made with cooperating agency.

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Agreement over-extends production resources available to NMD.	Low	Deadlines not met or adversely impact another program's funding.	a. D/I b. D/I c. D/I d. D/I e. D/I	a. NMD Policy on State Joint funding Agreements (Jan 1989). b. NMD Policy on Funding of Reimbursable Production Programs/ Approval of Agreement (June 1991). c. Policy on Work Share Agreements (July 1992). d. Policies and Guidelines on Agreements (Feb 1993). e. Cost Estimates for Reimbursable and/or Work Share Agreements (May 1993).
B. Establishes unreasonable schedule or delivery requirements that cannot be logically met by NMD.	Low	NMD required to shift production priorities for other work or risk causing cooperator to miss scheduled deadlines.	a. D/I b. I	a. Documentation listed above plus several levels of management review of proposed agreement would forestall. b. Generally will not enter into the kind of arrangement calling for specific delivery dates.
C. Establishes inappropriate or unauthorized cost share or work share agreements.	Low	Violates statutory funding guideline. Slows process when discrepancy discovered.	a. D/I	a. Guidelines in place handle standard requirements. (A, a-e) Custom products or inaccurate estimates are adjusted after the true costs are known.
D. Establishes agreement that obligates cooperator to conditions that cannot be met because of subsequent budgetary cuts or cost overruns.	Medium	NMD share of costs goes up which violates statutory funding requirements. Alternatively State has to provide additional funds or agree to less work.	a. I b. I/O	a. NMD gaining experience with process and refining estimating procedures for costs involved with QA/QC and bringing new contractors up to acceptable productivity levels. b. Production process being subjected to more intensive standardization as experience is gained.

2. Assign priority and schedule

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Production schedule and priority do not reflect conditions necessary to meet delivery schedule.	Low	Early delivery wastes production resources which could be used for higher priority items. Late delivery may violate agreement or shift delivery into time frame where funds are no longer available from cooperator.	a. I/D	a. 14-18 month completion time used for estimates is realistic. Supported by production records.

3. Assemble Source Material

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Required source material not available.	Medium	Source Collection activity delays production and stretches out schedule. May result in higher cost than estimated if contractor has to provide additional work.	a. I b. I	a. Negotiations with contractors not started until source package complete. b. Higher costs, alternative delivery schedules or project areas negotiated with cooperator prior to starting work.
B. Previously scheduled source collection activities are not completed when expected.	Low - Medium	Production schedule delayed until source collection complete. May negate plans. Must negotiate new schedule with customer.	a. I/D	a. Condition usually occurs when weather precludes completion of serial photography or control. Either can delay completion of control analysis. To date, schedule adjustments have been possible to accommodate customer needs. Documented in Memo For Records "Factors that contribute to long turnaround time in the acquisition of Government Furnished Photography for the DOQ Contract", dated Apr 21, 1994.

C. Quality of existing or new source does not meet requirements.	Low	Use unsatisfactory material with quality of finished product suspect, or upgrade/recollect source. May impact schedule if prod. Ctr. has to upgrade or if contractor has to upgrade or replace.	a. I	a. Experience shows that except in rare cases source quality is satisfactory or there is enough time to modify existing or collect new source.
D. Poor quality source may result in unacceptable deliverable.	Low	May fail QC. May have to pay contractor for unacceptable product if use of source mandated by NMD	a. I	a. Quality of source established and documented prior to delivery to contractor. On rare occasions when questionable source must be used, the judgement as to whether the delivery schedule and estimated product quality takes priority over time to acquire additional source is made and approved by NMD management.

4. Select Contractor

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Signs inappropriate award under pre-negotiated contract.	Not considered possible	May not be able to hold contractor to delivery schedules or quality standards.	a. I	a. Given checks and balances currently employed, contractor is very closely scrutinized. In addition to forms 254 and 255 which contractor must keep current, the COTR periodically visits the production site and evaluates procedures and personnel.
B. Contractor overextended/ unrealistically optimistic about capabilities	Low	Delivery late due to scheduling conflicts.	a. I/D	a. Correspondence chain and record of past performances are used to monitor contractor capability.
C. Contractor does not have appropriately trained personnel or uses inappropriate technology	Low	Quality of product suffers or delivery late.	a. I	a. Contractor's facility and production procedures, including personnel are evaluated as part of certification process. Contractor then required by law to keep CO informed of changes by means of Forms 254 and 225 listing changes in equipment or personnel. COTR periodically evaluates to ensure that procedures are being followed. Change in performance or quality of product would also be noticed by COTR or QA personnel.

5. Negotiate schedule. Price and suitability of source.

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Can't reach accord with contractor.	Low-Medium	Affects schedule. May lose contract or COOP funds.	a. I/O	a. Source suitability is no longer an issue given recently developed evaluation techniques. Additionally the capabilities and costing standards for each process used by contractors are generally well known by the NMD staff.

6. Credit NMD account with estimated cost

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Amount billed is more or less than negotiated in agreement.	Low-Medium	Statutory requirements may be compromised. Funds may not be available for other projects.	a. I	a. With more data NMD personnel are developing better cost averages and estimating criteria, which will reduce risk. If procedures changed to allow source collection and evaluation prior to estimating cost much more accurate estimates and schedules could be provided.

7. Manage Production of Deliverables

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Possible incremental payment before production complete.	Not considered possible	Relives contractor of need for prompt delivery.	a. I/O	a. Given checks and balances currently employed, contractor is closely scrutinized by the COTR. Weekly production status reports are required and coordinated with other COTRs and the CO staff.
B. Schedule adjustments in response to changing requirements may not be effectively communicated.	Low	May require cost adjustments or cause conflicts in schedules.	a. I	a. Procedures require review of modified delivery schedules which would disclose problems. Cost changes must be negotiated before work is permitted to commence.
C. Response to technical questions from contractor late or incomplete.	Low - Medium	Wrong information may result in inaccurate or incomplete product.	a. I/O	a. All technical questions and responses are recorded and the response reviewed by Chief, Contractor Management Section. Also reviewed by COTR committee.

D. Negligent COTR does not maintain adequate records or insufficient contact with contractor	Low	Delivery schedule or quality of product suffers.	a. I/O/D	a. Weekly CO/COTR meeting would drive out discrepancy between expected performance and actual progress, and COTR's knowledge of current status.

8. Receive completed DOQ from contractor

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Completed DOQ late	Low	Schedule met. May influence availability of cooperators funds. Internal funds not available next FY	a. I	a. Schedule well defined monitored by COTR. b. Funds available in advance. Only problem may be if agreed cost exceeded and additional resources are not available form cooperator.
B. Job incomplete or damage in transit	Low	Schedule not met. May require rework.	a. I	a. If minor discrepancies on product are found, they are returned to contractor for correction. If major problems are found, products are formally rejected by letter from CO and must be completely reworked by contractor. Close attention by COTR precludes most problems.
C. Source material not returned or damaged	Low	Source material not available for subsequent QC activities. Delay while source solicited from contractor.	a. I/D	a. This has not happened to date but is considered a possibility. Each piece of source is valued prior to being forwarded to contractor. Part of contract is that contractor will replace lost or damaged source.

9. Preform quality assurance/quality control procedure

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Assigning the wrong level of QC with respect to the capabilities of the contractor.	Low	Too stringent QA/QC procedures may delay throughout and delivery to customer. Too lax control procedures may allow poor quality DOQ to be accepted and paid for.	a. I b. D	a. Each delivery individually evaluated for appropriate QA based on complexity of job and known capabilities of contractors. b. Draft QA procedures manual completed and disseminated for use.

10. Pay Contractor

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Contractor paid for work not done.	None to Low	Government has to initiate cost recovery activities when situation discovered.	a. I	a. COTR signs invoice only after work completed and passed through QC procedures. Many personnel looking at progress throughout production cycle and status reported at weekly CO/COTR meetings.
B. Contractor paid early or late.	Low	Government cost accounting procedures are disrupted. May incur penalty for late payment.	a. I	a. Early payment extremely unlikely, see above. Late payment also unlikely because COTR or designated alternate ensures that job leaves production area in a timely manner and invoices are accounted for.

11. Forward product to cooperator

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Shipped Late	Low	May adversely impact customer's schedule.	a. I	a. Mapping Center has established a special unit responsible for receiving products from contractor and shipping to customer when QC complete.
B. Lost or damaged in transit	Low	Product needs to be regenerated at cost of additional time and resources.	a. I	a. Has not happened in past although there is slight possibility. Back up of all digital data forwarded maintained in production center until customer acknowledges receipt. Most digital data also forwarded to MAC for inclusion in the NDCDB.

12. Reconcile accounts

RISKS	RISK SCALE	IMPACT	TESTING*	CONTROL TECHNIQUES
A. Accounts are not reconciled or funds are applied to inappropriate accounts	None to Low	May have to return funds for products not received.	a. I	a. Each contract draws on individual project account which is set up and approved at various levels throughout the mapping center and the headquarters organizations. No work is authorized or invoice paid without appropriate approvals and reference to established accounts.

B. Actual costs are less than estimated.	Low	Negotiated with customer for additional services or products to be provided by NMD to make up difference.	a. I	a. As estimating techniques have improved, the risk of this happening is reduced. In the event that it should occur, most tasks are parts of continuing projects to which the resources could be applied with the customers approval.
C. Actual costs exceed estimates Cooperator can provide difference	Medium	Negotiate with customer for additional funds	a. I	a. Changing requirements on the part of the customer or quality or availability of source material may require modification of the contract to increase the cost. In most cases details are known far enough in advance to preclude adverse consequences. In some cases the scope of the work can be reduced if additional funds from the cooperator are not expected to be available.
D. Actual costs exceed estimates. Cooperator may not have funds to pay 50 % of difference between estimated and actual costs.	Medium	NMD pays more than 50% statutory requirement for matching funds compromised. Funds taken from other in house programs to make up difference.	a. I	a. This happens only when cooperator is unable to produce additional funds which were expected to be available. Because much of the uncertainty derives from the quality of the source material which is projected to be available, the risk could be decreased significantly if the production process could be adjusted to allow the source material to be evaluated for accuracy and completeness before cost estimates are prepared.

*TESTING

D Document Analysis – reviewing existing records, completed forms, or other documentation.

O Observation – watching the performance of specific control techniques.

I Interview – eliciting information from the personnel who perform the control technique.